IGF 146B-3/146 Series

IT-37R1

POWER-O-MATIC-60® PATENTED
SCIENTIFIC AND INDUSTRIAL OVENS

POWER-O-MATIC-70® PATENTED
SCIENTIFIC AND INDUSTRIAL OVENS

POWER-O-MATIC-80® PATENTED
OVENS AND FURNACES

POWER-O-MATIC-90® PATENTED
OVENS

FRICTION-AIRE™ PATENTED
OVENS

PRO-MASTER™
MICROPROCESSOR CONTROL

STABIL-THERM®
UTILITY OVENS

ULTRA-TEMP®
OVENS

MASTER/HEAT™
OVENS

Humid-Flow® PATENTED
AIR-COOLED
TEMPERATURE/HUMIDITY CABINETS

Magni Whirl® PATENTED IN U.S.A. AND CANADA
CONSTANT TEMPERATURE BATHS

vapor-temp® PATENTED
CONTROLLED HUMIDITY CABINETS

Constant-Flow PATENTED
PORTABLE COOLING UNITS

VERSA-RANGE®
REFRIGERATED TEST CHAMBERS

Lab-Heat
LABORATORY MUFFLE FURNACES

VERSA-Whirl
CONSTANT TEMPERATURE BATHS

Stabil-Glow®
FURNACES

RAD-O-GLOW
FURNACES

MODEL NO. IGF 146B-3

VOLTAGE 240-V

SERIAL NO. IG1-131

Read these instructions carefully before operating unit. Have them handy for ready reference at all times.

1229.

CONSTANT TEMPERATURE CONTROLLED EQUIPMENT TO +3000°F. (+1650°C.)

BLUE M

BLUE M Electric Company

CORPORATE HEADQUARTERS: BLUE ISLAND, ILLINOIS 60406
PHONES: (312) ~~468-7755~~ 385-9000 TWX: 910-689-3398

Designers and Manufacturers of
ELECTRIC OVENS, BATHS, ENVIRONMENTAL CABINETS, FURNACES, INCUBATORS, REFRIGERATED UNITS, AND ACCESSORIES

INERT GAS OVEN
WITH POM-60 CONTROL

1. MAINTENANCE AND OPERATING INSTRUCTIONS.....I-106-3 (I-1001-1B)
2. SUPPLEMENTARY INSTRUCTION FOR BLUE M INERT GAS OVENS.....I-110-1R1
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BLUE M IS IN THE PROCESS OF CHANGING ITS INSTRUCTION NUMBERING SYSTEM. THERE MAY BE TWO NUMBERS LISTED FOR A SPECIFIC INSTRUCTION ON THE TABLE OF CONTENTS; FIRST THE NEW NUMBER, FOLLOWED BY THE OLD NUMBER, IN PARENTHESIS. THE INFORMATION CONTAINED IS IDENTICAL, REGARDLESS OF THE NUMBERS ON THE INSTRUCTIONS.

BLUE M
BLUE M Electric Company
Corporate Headquaters: Blue Island, Illinois 60406

OPERATION AND MAINTENANCE INSTRUCTIONS FOR BLUE M MINIATURE BATCH OVENS WITH POM-60 CONTROL

I. INTRODUCTION

Blue M Batch Ovens are built to the highest industry standards. Your compliance with these instructions will assure long life and trouble-free operation.

MODEL	INSIDE DIMENSIONS	VOLTAGE/60HZ.AC./ SINGLE PHASE	WATTS	TEMP. RANGE
POM-563A,B,C	19W x 17½ x 18H	120/208/240	2 KW	TO +204°C
POM-566B,C	19W x 17½ x 18H	208/240	2 KW	TO +300°C

MODEL	DRAWER DIMENSIONS	VOLTAGE/60HZ.AC./ SINGLE PHASE	WATTS	TEMP. RANGE
POM-576B,C	15 7/8 x 19D x 3 3/4H	208/240	4 KW	TO +288°C

II. INSTALLATION

A. Inspect for damage sustained during shipment. All claims for damage or shortages must be reported immediately to carrier. Please do not return goods without written authorization.

B. Locate your oven in an area where line voltage variation is +10% or less, and room temperature is +25°C. +3°C, for best control accuracy. Avoid locations where power lines are overloaded, near outside entrances, heating or air conditioning vents. Allow at least 1 ft. clearance around oven to facilitate air circulation and safety.

C. Connect unit to proper power source. Consult data plate for specific voltage and amperage. Fuse protection should not exceed 125% of current rating. Be sure your oven is properly grounded. Connect a separate ground wire from metal frame to a suitable electrical ground.

NOTE: FOLLOW YOUR LOCAL ELECTRICAL CODE WITHOUT EXCEPTION WHEN INSTALLING THIS UNIT.

We recommend a fused disconnect switch be installed in the power line to oven.

III. OPERATING CONTROLS AND FEATURES

A. POM-60 Temperature Control - Rotate the dial to the exact temperature desired. For more information on dials, calibration, etc., see I-301-13R1, enclosed.

B. Voltmeter - Connected across heating elements to indicate percentage of available voltage applied.

C. Main Pilot Light - Indicates circuit breaker is in the "ON" position and power is being supplied to unit.

D. Circuit Breaker - Provides power to oven in the "ON" position.

E. Temperature Indicator - Displays work chamber temperature. See I-202-4, enclosed, for detailed information on calibration, etc.

F. Panel Fuse - Protects control circuit. Replace with same size and type.

G. Overtemperature Protection (OTP) Control - This system consists of a temperature sensing thermostat, external time delay, and reset circuit. The unit will restart automatically if overtemperature condition is momentary, e.g., power surge. In case of interrupted power, manual reset is not required.

Generally, the OTP is set 10°C higher than operating temperature. Set the OTP by following procedure below.

1. Turn OTP control fully clockwise.
2. Turn unit on, set desired temperature, and allow unit to stabilize.
3. Slowly rotate OTP counter-clockwise until OTP trips. Observe trip temperature on dial.
4. Rotate OTP control 10°C higher than trip point in Step 3. Press reset button; unit should operate normally.

If temperature within work chamber rises to OTP set point, device will trip and shut unit down. As unit cools below set point, max-set circuitry will restart oven automatically. This cycle should repeat 3 times if overtemperature condition is not rectified. If unit continues to cycle on and off, the resistor mounted behind reset button (thermally activated time delay) is positioned too far from button: if OTP trips and shuts down completely without cycling, resistor is too close to reset switch. Average resistor-to-switch spacing is approximately 3/16". OTP must be manually reset after oven completely shuts off.

NOTE: CAUSE OF OVERTEMPERATURE CONDITION SHOULD BE CORRECTED BEFORE UNIT IS RESET.

Periodically, turn the temperature control above OTP set point to verify proper OTP operation.

H. Control Failure Light - Glows when oven has shut down due to an overtemperature condition.

I. OTP Reset Button - Pressing this switch returns oven to operation after shut down due to an overtemperature condition.

J. Range-Lock Protection - This feature limits voltage applied to the heating elements to a predetermined value, even if the control is set to maximum temperature or if both the main control and OTP fail.

To set range-lock, follow the procedure below.

1. Allow oven to stabilize at operating temperature. Secure dial pointer with lock.
2. Remove the range-lock access cover (small stainless button) on the control panel, located above main control dial.
3. Insert screwdriver into hole and engage slotted shaft.
4. Slowly turn shaft counter-clockwise, while observing voltmeter.
5. When the voltmeter abruptly drops from its initial reading, stop turning the shaft.
6. Now turn shaft clockwise approx. 3/4 turn.
7. The maximum voltage across the heating elements is now fixed at a value slightly higher than the maximum required to maintain temperature. In the event of control failure, temperature will be maintained within the confines of line voltage variation.

NOTE: SINCE TEMPERATURE VARIATION IS NOW DEPENDENT ON LINE VOLTAGE VARIATION SET RANGE-LOCK WHEN LINE VOLTAGE IS AT ITS HIGHEST LEVEL.

IV. OPERATION

A. Turn on circuit breaker.
B. Rotate OTP control 10°C. higher than operational set point. Press reset button.
C. Adjust main temperature control.

Unit should now operate normally.

V. MAINTENANCE

WARNING: DISCONNECT POWER BEFORE SERVICING.

A. If oven fails to heat.

1. Be sure main power source is turned on.
2. Check control fuse on instrument panel.
3. Check all electrical connections. Repair or tighten, if necessary.
4. Inspect door seal for leaks. Gasket should be replaced after several years service. Adjust door seal as required.
5. Inspect heating elements for continuity and deterioration.

B. Heating Element Replacement.

1. Remove upper panel in work chamber to expose elements.
2. Remove cover from element terminal box on upper right rear of oven. Disconnect and straighten element leads.
3. Depress element support clips and carefully remove element.

Reverse procedure for installation of new elements. When installing, re-insert ceramic insulating beads on element lead wire.

SUPPLEMENTARY INSTRUCTIONS FOR BLUE M INERT GAS OVENS

I. INTRODUCTION

Properly operated, this oven provides ability to heat treat materials while partially or completely eliminiating high temperature oxidation. This is accomplished by replacing atmospheric oxygen with a chemically inert gas, such as nitrogen, or carbon dioxide, during heating processes.

Oven has been constructed with an inner chamber which is almost gas-leak free; this has been accomplished by providing special seals on door, blower shaft and element terminals. These seals rely on gas flow for cooling; reasonable seal life is dependent on continued gas flow during oven use.

There are three operational steps involving gas systems. Failure to carry out any of these steps properly may result in oxidized work loads. Steps are as follows:

a. Purge

b. Run Up And Hold

c. Cool Down

II. GAS SYSTEM OPERATION

A. Purge Cycle is required to dilute room air in oven and replace it with inert gas. Generally, purge cycle should force a quantity of gas equal to five to ten times volume of work chamber through oven. In less critical applications, five times volume of work chamber is acceptable; in applications involving materials extremely susceptible to oxidation, gas equal to ten times volume of work chamber (or More) may be required. Table 1 shows purge gas flow rates and times required to introduce necessary volume of gas into work chambers of various ovens. (Table was prepared using a factor of approximately seven times work chamber volume.

NOTE: VALUES IN TABLE 1 ARE APPROXIMATE. IF DESIRED RESULTS ARE NOT OBTAINED USING THESE VALUES, INCREASE RATES UNTIL DESIRED RESULTS ARE ACHIEVED.

NOTE: ON THOSE OVENS WITH TWO GAS INLET CONNECTIONS, ALL PURGING GAS SHOULD BE DIRECTED INTO WORK CHAMBER;

GAS INJECTED BETWEEN DOORS "THROAT" SHOULD NOT BE CONSIDERED PART OF PURGE RATE. OVEN IS PROVIDED WITH SLIGHT LEAKAGE RATE TO ALLOW MIXTURE OF PURGING GAS AND ROOM AIR TO ESCAPE. IF LEAKAGE RATE IS CONSIDERABLY LESS THAN GAS FLOW, PRESSURE WILL BUILD IN WORK CHAMBER AND PRESSURE RELIEF VALVE WILL OPEN.

UNTIL PURGE CYCLE IS COMPLETED, ATMOSPHERE WITHIN WORK CHAMBER IS A MIXTURE OF GAS AND ROOM AIR. FOR THIS REASON, PURGE CYCLE MUST BE FINISHED BEFORE HEAT IS APPLIED TO WORK CHAMBER; FAILURE TO ALLOW PURGE CYCLE TO COMPLETE MAY RESULT IN WORK LOAD OXIDATION.

B. Run-Up And Hold Cycle

A slight positive pressure must be maintained while running up to setpoint temperature, and throughout heating portion of operation. One or two oz. per square inch (two to three inches of water column) should be sufficiant. Table 1 lists flow rates necessary to provide pressure. In some cases, a lesser rate will maintain sufficiant pressure, but with a smaller safety factor. Failure to maintain pressure may result in oxygen entering work chamber.

NOTE: DO NOT REDUCE GAS FLOW RATE BELOW 50% OF RATE SHOWN IN TABLE 1; FURTHER REDUCTION IN FLOW RATES MAY RESULT IN OVERHEATING AND DAMAGE.

WHEN REDUCED FLOW RATES ARE USED, POSITIVE PRESSURE MUST BE MAINTAINED THROUGHOUT ENTIRE RUN. PRESSURES INDICATED ON GAUGE MAY VARY WIDELY DURING DIFFERENT PORTIONS OF CYCLE. PRESSURE WILL INCREASE AS TEMPERATURE RISES, DECREASE AS TEMPERATURE DROPS. MINIMUM PRESSURE WILL EXIST WHEN OVEN IS AT AMBIENT TEMPERATURE.

C. Cool-Down Cycle

Gas atmosphere must be maintained until workload is below temperature at which oxidation will occur. (Oxidation is generally detectable by discoloration of work-load.) 125°C. is considered highest safe temperature; most materials may be removed from oven at this temperature without discoloration. If oxidation does occur at this temperature, tests will indicate temperature at which materials may be safely exposed to room atmosphere.

One small units, gas flow rates during cool-down should be same as run rates. On large, forced-air-cooled units, it is necessary to increase gas flow rates during cool-down.

On these units, shock from rapidly changing temperatures may cause door seals to distort and positive gas pressure may be lost. Increased flow rates will keep oven atmosphere oxygen-free. (See table #1 for cool-down flow rates.)

To avoid excessive heat shock to seals, length of cool-down times must be extended on large units. A minimum of two hours must be allowed for oven to cool from operating temperature to safe unloading temperature.

. Slowing of cooling process may be achieved by allowing oven to cool for a period of time with heat and cooling blower OFF. After a suitable period, exhaust vent may be opened slightly, and blower started. As oven cools, exhaust vent may be opened farther.

Keep in mind, when processing high-mass loads, that during cool-down, workload temperature may be higher than temperature indicated on oven temperature indicator. Again, tests will determine when load may be removed from oven without discoloration.

III. TYPICAL INSTALLATION

Figure #1 illustrates installation of High Temperature Inert Gas Oven, including its two gas connections. Connection closest to center of oven introduces gas into work chamber at blower shaft seal; second connection provides gas in throat area between inner and outer door seals. Low temperature models have only one gas connection, which is to blower shaft seal. Ovens with double connection may be indentified in Table #1 as these models have two flow rates shown in Run Rate Column. Higher rate is for work chamber, lower rate is for throat area.

NOTE: GAS FLOW TO THROAT IS NOT TO BE INCLUDED WHEN CALCULATING PURGE FLOW RATE AND TIME; GAS INTRODUCED INTO THIS AREA IS INTENDED TO COOL DOORS SEALS ONLY. GAS TO OVEN MUST BE PRESSURE REGULATED TO LESS THAN 100 PSI; 40 TO 50 PSI IS RECOMMENDED.

IV. RECOMMENDED GASES

Only following gases are approved for use with these ovens:

a. Nitrogen

b. Carbon Dioxide

c. Helium

d. Argon

e. Forming Gas

NOTE: THESE OVENS ARE DESIGNED FOR USE ONLY WITH NON-EXPLOSIVE OR NON-FLAMMABLE GASES OR GAS MIXTURES. FORMING GAS (MIXTURE OF NITROGEN AND HYDROGEN) MAY BE USED PROVIDING ALL FOLLOWING RESTRICTIONS ARE OBSERVED. OPERATOR INJURY AND EQUIPMENT DAMAGE MAY RESULT IF THESE PRECAUTIONS ARE NOT FOLLOWED.

1. Use ONLY commercially prepared and bottled gas mixtures.

2. DO NOT use forming gas mixtures that contain more than 8% hydrogen in normal room atmosphere. In oxygen rich room environments, restrict hydrogen content to 5% or less.

3. DO NOT apply heat to oven until purge cycle is completed. Any oxygen remaining in oven may combine with hydrogen in forming gas to form water vapor. Such reaction will cause a sudden reduction in gas volume and a negative pressure may exist within chamber. Under these conditions, room air may enter work chamber and cause oxidation of work load.

4. DO NOT open door to load or unload oven at elevated temperatures. (See item 3, above.)

Following precautions must be observed regardless of type of gas used.

a. Oven must not be operated in confined or poorly ventilated areas; inert gas can displace sufficient air to cause suffocation of personnel.

b. Maximum gas inlet pressure is 100 PSI. Proper pressure regulating equipment is required between gas cylinders and oven. UNDER NO CIRCUMSTANCES CONNECT GAS CYLINDERS DIRECTLY TO OVEN OR OPERATOR INJURY AND EQUIPMENT DAMAGE MAY RESULT.

c. Compressed gases and gas cylinders are inherantly dangerous and should be handled only by properly trained personnel.

Selection of proper gas atmosphere depends greatly on materials to be processed and purpose of treatment. Choice of gas is primarily dependent on compatibility with material being processed. There are numerous grades of any inert gas. Gas supplier should be made aware of requirements of processing being carried out with this oven. Contaminants, such as free oxygen, and water vapor, can cause serious problems in operation.

V. MATERIAL PREPARATION

WARNING! MATERIAL FOR PROCESSING MUST BE FREE OF CONTAMINANTS. ANY PARTICLES DISPERSED FROM THE LOAD WILL ACCUMULATE ON INSULATORS OF HEATING ELEMENTS, CAUSING SHORT-CIRCUIT FAILURE OF THE ELEMENTS AND POSSIBLE DAMAGE TO THE CONTROL SYSTEM.

DEGREASING IS ESSENTIAL TO ELIMINATE OILS FROM FABRICATIONS. ANY ORGANIC COMPOUND THAT REMAINS IN OVEN CHAMBER WILL REDUCE TO CARBON AT NORMAL OPERATING TEMPERATURES. IT IS ABSOLUTELY ESSENTIAL THAT THE SURFACES OF PARTS BE ABSOLUTELY CLEAN AND FREE OF ANY HYDROCARBON BASE MATERIAL.

WHEN PROCESSING NICKEL-IRON ALLOYS, TECHNIQUES SUCH AS ELECTRO-POLISHING, PASSIVATING, AND BRIGHT DIPPING ARE REQUIRED TO ASSURE CLEAN SURFACES.

BE SURE THAT THE MELTING POINT OF METALS FOR PROCESSING IS NOT EXCEEDED BY THE OVEN TEMPERATURE, OR PARTICLES OF METAL WILL COLLECT ON THE ELEMENTS AND DESTROY THEM.

MECHANICAL POLISHING MAY BE DETRIMENTAL SINCE POLISHING COMPOUNDS ARE EMBEDDED IN MATERIAL SURFACE. IF THESE COMPOUNDS ARE NOT REMOVED CHEMICALLY BEFORE HEAT TREATMENT, DISCOLORED FINISHED PARTS WILL RESULT.

PARTS SHOULD BE HANDLED BY PERSONNEL WITH GLOVES ONLY. OILS FROM FINGERS WILL BE EMBOSSED INTO MATERIAL SURFACE DURING HEAT TREATMENT.

TABLE 1

MODELS	PURGE FLOW RATE and PURGE TIME	RUN FLOW RATE	COOL RATE
IGF-146	100 SCFH For 11 Min.	20 SCFH	Same as Run Rate
IGF-206	100 SCFH For 27 Min.	25 SCFH	Same as Run Rate
IGF-256	200 SCFH For 18 Min.	30 SCFH	Same as Run Rate
IGF-136	200 SCFH For 30 Min.	60 SCFH	Same as Run Rate
IGF-336	200 SCFH For 30 Min.	60 SCFH	Same as Run Rate
IGF-1406	600 SCFH For 25 Min.	120 SCFH	Same as Run Rate
IGF-3306	600 SCFH For 30 Min.	140 SCFH	Same as Run Rate
IGF-5580	100 SCFH For 11 Min.	15 SCFH to Oven 5 SCFH to Throat	Same as Run Rate
IGF-6680	100 SCFH For 27 Min.	22-1/2 SCFH to Oven 7-1/2 SCFH to Throat	Same as Run Rate
IGF-7780	200 SCFH For 18 Min.	25 SCFH to Oven 7-1/2 SCFH to Throat	Same as Run Rate
IGF-8880	200 SCFH For 33 Min.	50 SCFH to Oven 15 SCFH to Throat	200 SCFH
IGF-9980	600 SCFH For 24 Min.	95 SCFH to Oven 25 SCFH to Throat	600 SCFH
POM-104 SIZE	200 SCFH For 26 Min.	60 SCFH to Oven	Same as Run Rate
POM-164 SIZE	600 SCFH For 16 Min.	100 SCFH to Oven	Same as Run Rate
POM-244 SIZE	600 SCFH For 24 Min.	145 SCFH to Oven	Same as Run Rate
POM-324 SIZE	600 SCFH For 32 Min.	160 SCFH to Oven 35 SCFH to Throat	Same as Run Rate
POM-604 SIZE	1800 SCFH For 20 Min.	300 SCFH to Oven 60 SCFH to Throat	Same as Run Rate
POM-804 SIZE	1800 SCFH For 27 Min.	400 SCFH to Oven 80 SCFH to Throat	Same as Run Rate
POM-964 SIZE	1800 SCFH For 32 Min.	500 SCFH to Oven 100 SCFH to Throat	Same as Run Rate

BLUE M Electric Company
Corporate Headquarters: Blue Island, Illinois

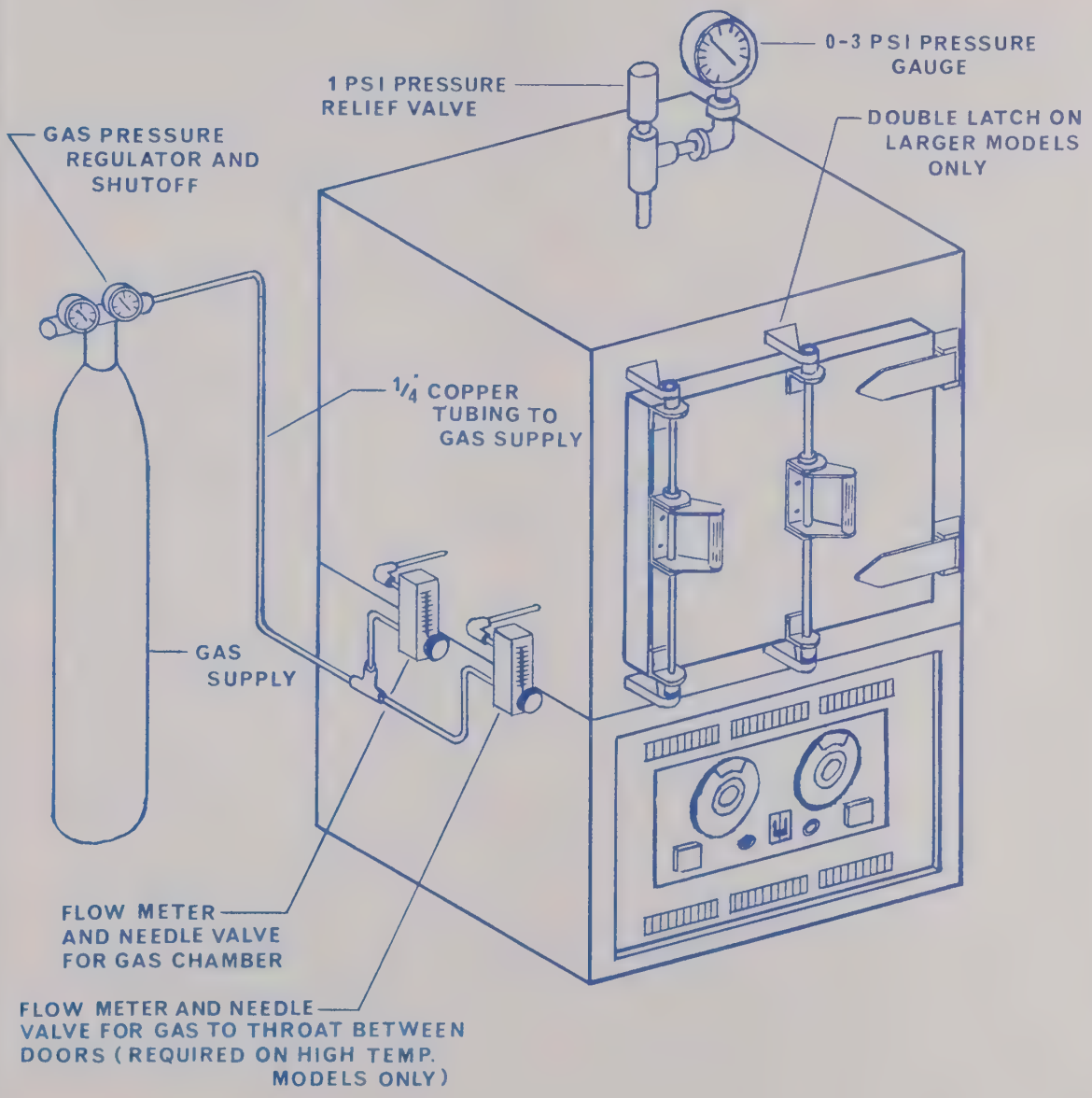
0-3 PSI PRESSURE GAUGE
1 PSI PRESSURE RELIEF VALVE
DOUBLE LATCH ON LARGER MODELS ONLY
GAS PRESSURE REGULATOR AND SHUTOFF
1/4" COPPER TUBING TO GAS SUPPLY
GAS SUPPLY
FLOW METER AND NEEDLE VALVE FOR GAS CHAMBER
FLOW METER AND NEEDLE VALVE FOR GAS TO THROAT BETWEEN DOORS (REQUIRED ON HIGH TEMP. MODELS ONLY)

FIGURE 1

OPERATION AND CALIBRATION OF BLUE M MEMORY RING® DIAL SYSTEM

Blue M's patented Memory Ring Dial System is supplied with many Blue M temperature control systems. The Memory Ring allows accurate and repeatable temperature settings throughout range of unit. All dials are factory calibrated to commercially acceptable standards.

NOTE: This is a dual scale dial. Care must be taken to read the correct scale when selecting operating temperature.

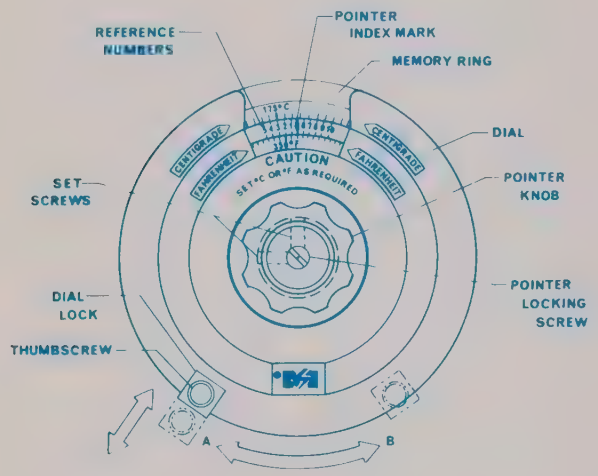

Figure 1

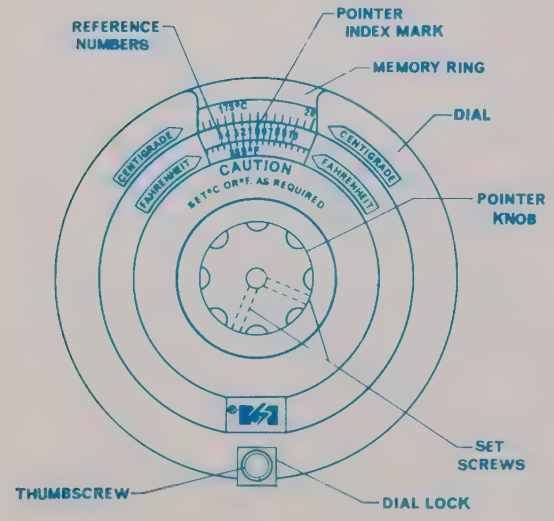

Figure 2

USING THE MEMORY RING AND REFERENCE NUMBERS:

1. Turn unit ON according to basic unit instructions.
2. Unlock dial (refer to Dial Lock Section), and rotate knob until pointer index mark is aligned with desired temperature, +175°C. in this case. Refer to figures 1 and 2.
3. Allow unit to stabilize (approximately 1 hour without temperature change, as measured by an independent temperature indicator of known accuracy).
4. If temperature measured within chamber does not agree with dial setting, rotate pointer knob slightly in desired direction to bring unit to required temperature.

NOTE: Rotate knob CLOCKWISE to INCREASE temperature; rotate COUNTERCLOCKWISE to DECREASE temperature.

5. Allow unit to stabilize (approximately 15 minutes).
6. Repeat steps 4 and 5 until unit stabilizes at exactly +175°C.
7. Note which reference number is lined up with +175°C. Assume that the number 3 lines up in this example. Refer to figure 3.

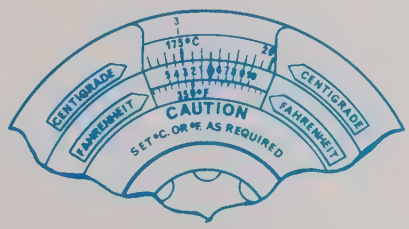

Figure 3

8. Using a pencil or ball-point pen, make a small mark on Memory Ring above +175° C, mark, and write correction number "3" above mark.
9. In future, when control is turned to +175°C., the correction number 3 will appear in pointer window. It will coincide with number 3 on dial pointer and indicate proper setting for +175°C.
10. All temperatures may be calibrated in the same manner. The dial may be calibrated in normal use by marking a correction number when proper temperature is reached.

NOTE: If any desired temperature setting cannot be accommodated in pointer window, recalibration of control dial may be required.

DIAL LOCKS: There are two dial locks utilized on Blue M temperature control units. One is fixed below the center of dial, figure 2, and one has a two position dial lock as shown in figure 1. The movable lock allows 370° rotation of dial.

To lock dial with two position lock, swing it as far to the left or right as possible and push it up towards center of dial until dial is engaged. Tighten thumbscrew to hold dial in position. When thumbscrew is released, lock will fall away from dial.

To engage fixed lock as shown in figure 2, turn thumbscrew clockwise to lock dial; counterclockwise to release it.

RECALIBRATING CONTROL DIALS

Recalibration should only be necessary after replacing a component in control systems, after extended heavy usage, or if desired temperature cannot be accommodated within pointer window. ALWAYS use an independent temperature indicator of known accuracy when recalibrating dial.

To recalibrate control unit with movable lock, (also identifiable by screw in the middle of the pointer knob), proceed as follows:

1. With unit operating, set pointer index mark to some mid-scale temperature.
2. Lock dial securely.
3. Allow unit to stabilize (approximately 1 hour without temperature change).
4. Loosen the pointer locking screw in center of knob, and loosen two knob set screws (see figure 1). Loosen dial lock. Dial should now rotate independently of the knob and shaft. Note: it may be necessary to pull knob forward slightly to free dial.
5. Turn dial to align pointer index mark with actual temperature within chamber.
6. Tighten dial lock.
7. While holding pointer knob firmly, tighten pointer locking screw, then two set screws.
8. Allow unit to operate 15 minutes, and re-check temperature to be sure that setting was not disturbed during calibration. If setting was changed, allow unit to stabilize and repeat entire procedure.
9. Check reference marks on Memory Ring for accuracy. If necessary, remove marks and follow procedure outlined under "Using the Memory Ring and Reference Numbers."

To recalibrate unit with fixed lock (also identifiable by lack of a screw in center of pointer knob), proceed as follows:

1. With unit operating, set pointer index mark to some mid-scale temperature, and lock dial.
2. Allow unit to stabilize (approximately 1 hour without temperature change.)
3. Loosen set screws sufficiently to allow knob and dial to rotate independently of shaft.
4. Loosen dial lock.
5. Rotate dial on shaft until the pointer index mark is aligned with actual temperature within chamber.
6. Tighten dial lock.
7. Tighten set screws in pointer knob.
8. Allow the unit to operate 15 minutes and re-check temperature to be sure that setting was not disturbed during calibration. If setting was changed, allow unit to stabilize and repeat entire procedure.
9. Check reference marks on Memory Ring for accuracy. If necessary, remove marks and follow procedure outlined under "Using the Memory Ring and Reference Numbers".

OPERATION OF BLUE M OTP SYSTEMS WITH MEMORY RING DIAL

Operation and Maintenance of Blue M's Overtemperature Protection Systems (OTP) are basically the same as for the temperature control systems supplied with the Memory Ring Dial, with the following differences:

OPERATION

1. With the unit operating, loosen the dial lock (see figure 1).
2. Set the OTP control index pointer to a point approximately 5° to 10°C. (10° to 20°F.) above the desired operating temperature.
3. If "Control Failure" light glows, press reset button.
4. Unit will now operate, with OTP shutting down the unit in the event of an over temperature condition.

Calibration of the unit is the same as that of the temperature control systems, with the following differences:

1. Loosen the dial lock and turn OTP control knob fully clockwise; operate unit until it stabilizes at desired temperature, +175°C., in this case. (see figure 1).
2. Turn OTP control down (counterclockwise) until the OTP trips and shuts down unit, sounding buzzer.
3. Observe the reference number that is lined up with +175°C., and proceed by following the instructions outlined in "Using the Memory Ring and Reference Numbers" section of this manual, starting with number 7.

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MANUFACTURERS AND ORIGINAL DESIGNERS OF CONSTANT TEMPERATURE CONTROLLED EQUIPMENT

Printed in U.S.A.

BLUE M

INSTRUCTION NO. I-206-1R1

BLUE M MAX-SET

OVERTEMPERATURE PROTECTION SYSTEM (OTP)

I. INTRODUCTION

System consists of a temperature sensing thermostat, external time delay and reset circuit. Design of circuit allows unit to re-start automatically if overtemperature condition is momentary (ie., power surge to unit); in case of interrupted power to unit, manual reset is not required.

II. CALIBRATION

OTP is supplied with dial calibrated in reference numbers of degrees (F or C). Each reference number represents approximately 10°C. (20°F.). Generally, OTP should be set 10°C. (one reference number) higher than desired operating temperature. To set OTP, proceed as follows:

A. Turn OTP control fully clockwise.
B. Turn unit ON, set to desired operating temperature and allow unit to stabilize.
C. Slowly rotate OTP control counterclockwise until control trips shutting unit OFF. Observe temperature or reference number at which OTP trips.
D. On units with reference numbers, rotate control one reference number higher than number obtained in step C, above. Press RESET BUTTON; unit should now operate normally.
E. On units calibrated in degrees, set OTP control 10°C. higher than temperature obtained in step C, above. Press RESET BUTTON; unit should operate normally.

More precise calibration may be achieved by following directions in Memory Ring Instructions, enclosed.

If temperature within work chamber rises to OTP setpoint, device will trip, and shut unit down. As unit cools below OTP setpoint, Max-Set circuitry will restart unit automatically. This cycle should repeat three times, if overtemperature condition is not rectified. If unit continues to cycle on and off, resistor mounted behind RESET BUTTON (thermally activated time delay) is positioned too far from Re-Set switch; if unit trips and shuts unit down completely without cycling, resistor is too close to re-set switch. Average spacing between resistor and re-set switch is approximately 3/16". OTP must be manually reset after unit completely shuts off.

NOTE: Cause of overtemperature condition should be corrected before unit is reset.

III. MAINTAINENCE

A. Periodically, turn temperature control above OTP setpoint to verify proper operation of OTP system.
B. If OTP should malfunction, check OTP thermostat; contacts should be closed when OTP control is set above unit operating temperature; open when control is set below operating temperature.

IV. PROTECTION OF LIVE ELECTRICAL TEST LOADS

When testing live electrical loads, damage to load may occur if load power supply is not interlocked with OTP. In event of overtemperature condition, power to unit will be shut off; however, heat generated by test load may be sufficient to cause damage to load and unit. It is suggested that test load power supply be interlocked with OTP to insure power to load will be cut when OTP trips. Suggested practice is to connect safety interlock coil in parallel with OTP contactor coil.

BLUE M

BLUE M Electric Company

CORPORATE HEADQUARTERS: BLUE ISLAND, ILLINOIS 60406

MANUFACTURERS AND ORIGINAL DESIGNERS OF CONSTANT TEMPERATURE CONTROLLED EQUIPMENT

IMPORTANT NOTICE FOR 3 PHASE OVENS

WARNING

BLOWER MUST ROTATE IN THE PROPER DIRECTION TO INSURE EFFICIENCY.

INCORRECT BLOWER ROTATION RESULTS IN A SUBSTANTIAL REDUCTION OF AIR-FLOW.

CHECK FOR CORRECT BLOWER ROTATION WITH BLOWER MOTOR OPERATING. OPEN OVEN DOOR AND NOTE AIR-FLOW AT DISCHARGE POINTS ON RIGHT HAND SIDE OF OVEN INTERIOR. WHEN ROTATION IS CORRECT, RAPID AIR-FLOW CAN BE FELT AT THIS POINT.

IF BLOWER ROTATION IS INCORRECT, REVERSE ANY TWO POWER LINE CONNECTIONS, AND BLOWER ROTATION WILL BE REVERSED.

IF YOU ARE IN DOUBT, CHECK AIR-FLOW WITH POWER LINES CONNECTED BOTH WAYS TO DETERMINE WHICH PRODUCES GREATEST AIR-FLOW.

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